2/18/92

TO: Klamath Fishery Management Council

FROM: KRTAT

SUBJECT: Age composition of the 1991 Klamath River fall chinook run based on scale sampling program.

A total of 6,287 scales collected from 16 sampling locations were examined to estimate the age composition of the 1991 Klamath River fall chinook run (Table 1). The ages of 263 samples were not determined due to scale aberrations (regeneration, resorption, or inconclusive circuli patterns). Some of the data were not used in calculating the age composition of the in-river run because: 1) they were already included in another data set (ie. TRH was included in the Willow Creek data set) or 2) escapement or harvest data were not included in the run size estimate compiled by CDFG.

When data were available, the weekly age composition was multiplied by the number of fish counted (ie. weirs and hatchery) or harvested (net fishery) to determine the number for each age class. The overall age composition was calculated by summing the weekly estimates for numbers per age class. In cases when weekly counts were not available, the age composition was determined by summing the weekly samples for the entire season (spawning ground surveys, sport harvest) and multiplying by the total estimate for the respective sampling site. The age composition based on scale samples collected at the Willow Creek weir was used to calculate the numbers of chinook in each age class that spawned (natural spawning areas and hatchery) or were harvested above this sampling location. The Willow Creek weir data were used because of the apparent unrepresentative sampling at Trinity River Hatchery (TRH) which provided an apparent overestimate of the age 2 component of the hatchery return. Using scale data, it was estimated that 537 jacks returned to TRH while CDFG, using a jack length cutoff of 55 cm, counted 179 jacks into the hatchery. A total of 47 scale samples from TRH were aged as 2-year-olds while remaining 240 aged scales were from adults. Based on jack and adult hatchery returns reported by CDFG, this would represent a 26.3% sampling rate for jacks and a 9.5% sampling rate for adults. Another reason for using the Willow Creek weir data was the absence of scale samples from the sport harvest on the Trinity River. For locations lacking scale data, sites believed to be appropriate as a surrogate were used (Table 2).

The 1991 Klamath River fall chinook run consisted of 1,894 jacks (5.7%), 10,278 3-year-olds (31.1%), 19,864 4-year-olds (60.1%), and 1,013 5- and 6-year olds (3.1%)(Table 3 & 4). The age composition of the run based on scale samples corresponds very well with the age composition derived from coded wire tag (CWT) data (Table 5). The largest discrepancy occurs in the 5-year-old age class (age 6 chinook are included in this category). To adjust the scale data to be more comparable to the CWT data, the

jack escapement and harvest estimates compiled by CDFG were used and the age composition of the adults was applied to only the adult escapement and harvest estimates (Tables 6,7,& 8). Treating the scale data in this manner provides an estimate of age 3 and age 4 chinook virtually the same as the CWT data.

It is recommended that this program be continued so that another year of data comparing the age composition based on scale and CWT data can be collected. Standardized sampling procedures should be discussed with personnel collecting the scales so that proper sampling procedures are followed. It is also recommended that data collected from the Willow Creek weir be used to assess the age composition of salmon above this site. The collection of scales from Trinity River Hatchery may be conducted to estimate the age composition of the hatchery escapement but this data would not be necessary for estimating the age composition of the run.

Table 1. Sampling locations and numbers of samples collected for determination of the 1991 Klamath River fall chinook run.

Sampling Area	# Samples	Agency
Iron Gate Hatchery	478	CDFG
Trinity River Hatchery	289	CDFG
Shasta River Weir	328	CDFG
Scott River Weir	451	CDFG
Salmon River Weir	86	CDFG
Bogus Creek Weir	398	CDFG
Willow Creek Weir	809	CDFG
South Fork Trinity Weir	11	CDFG
Trinity Carcass Survey	357	CDFG
Scott & Salmon Carcass Survey	39	USFS
Klamath Creel Census	477	CDFG
Hoopa Net Harvest	423	HOOPA
Karuk Dip Net Harvest	96	KARUK
Yurok Harvest (Estuary)	830	USFWS
Yurok Harvest (Middle Klamath)	414	USFWS
Yurok Harvest (Upper Klamath)	801	USFWS

Table 2. Locations without scale samples and surrogate data sets used.

Location	Age Composition Used
Main Stem Klamath Spawners	Salmon, Scott and Shasta Rivers
Misc. Klamath Trib Spawners	Salmon, Scott and Shasta Rivers
Reservation Trib Spawners	Trinity River Natural Escapement

Table 3. Age composition of 1991 Klamath River fall chinook run.

	Age					
	2	3	4	5	6	Total
Hatchery Spawners						
Iron Gate Hatchery	23	1,159	2,686	199	0	4,067
Trinity River Hatchery	112	1,332	1,218	36	0	2,698
Subtotal	135	2,491	3,904	235	0	6,765
Natural Spawners						
Trinity River (above Willow Ck)	207	2,468	2,255	67	0	4,997
Salmon River	472	191	1,030	25	22	1,740
Scott River	144	401	1,054	46	0	1,645
Shasta River	16	79	621	10	0	726
Bogus Creek	14	367	863	37	0	1,281
Main Stem Klamath River	65	70	280	8	2	426
Misc Klamath Tributaries	92	97	392	12	3	596
Reservation Tributaries	7	73	80	0	0	160
Subtotal	1,017	3,745	6,576	206	27	11,571
TOTAL SPAWNER ESCAPEMENT	1,152	6,237	10,479	441	27	18,336
Angler Harvest						
Klamath River (below US 101 br)	79	154	89	1	0	323
Trinity River (above Willow Ck)	49	588	538	16	0	1,191
Balance of Klamath System	499	976	561	9	0	2,045
Subtotal	627	1,719	1,187	26	0	3,559
Indian Net Harvest						
Klamath River (below US 101 BR)	27	550	3,094	236	2	3,909
Klamath River (US 101 to Trin.R.)	50	1,191	3,596	201	4	5,042
Trinity River	18	377	879	37	0	1,311
Subtotal	95	2,118	7,569	474	6	10,262
TOTAL IN-RIVER HARVEST	722	3,837	8,756	500	6	13,821
TOTALS						
In-River Harvest and Escapement	1,874	10,074	19,235	941	33	32,157
Angling Mortality (2% of Harvest)	13	34	24	1	0	71
Net Mortality (8% of harvest)	8	169	606	38	0	821
TOTAL IN-RIVER RUN	1,894	10,278	19,864	979	34	33,049

Table 4. Age composition (percentages) of 1991 Klamath River fall chinook run.

	Age				
	2	3	4	5	6
Hatchery Spawners					
Iron Gate Hatchery	0.57%	28.50%	66.04%	4.89%	0.00%
Trinity River Hatchery	4.14%	49.39%	45.13%	1.34%	0.00%
Subtotal	1.99%	36.83%	57.70%	3.48%	0.00%
Natural Spawners					
Trinity River (above Willow Ck)	4.14%	49.39%	45.13%	1.34%	0.00%
Salmon River	27.13%	10.98%	59.20%	1.44%	1.26%
Scott River	8.75%	24.38%	64.07%	2.80%	0.00%
Shasta River	2.20%	10.88%	85.54%	1.38%	0.00%
Bogus Creek	1.09%	28.65%	67.37%	2.89%	0.00%
Main Stem Klamath River	15.37%	16.32%	65.80%	1.97%	0.54%
Misc Klamath Tributaries	15.37%	16.32%	65.80%	1.97%	0.54%
Reservation Tributaries	4.35%	45.51%	49.86%	0.29%	0.00%
Subtotal	8.79%	32.37%	56.83%	1.78%	0.24%
TOTAL SPAWNER ESCAPEMENT	**6.28%**	**34.01%**	**57.15%**	**2.40%**	**0.15%**
Angler Harvest					
Klamath River (below US 101 br)	24.41%	47.75%	27.41%	0.43%	0.00%
Trinity River (above Willow Ck)	4.14%	49.39%	45.13%	1.34%	0.00%
Balance of Klamath System	24.41%	47.75%	27.41%	0.43%	0.00%
Subtotal	17.63%	48.30%	33.34%	0.73%	0.00%
Indian Net Harvest					
Klamath River (below US 101 BR)	0.69%	14.07%	79.15%	6.04%	0.05%
Klamath River (US 101 to Trin.R.)	0.99%	23.62%	71.32%	3.99%	0.08%
Trinity River	1.37%	28.76%	67.05%	2.82%	0.00%
Subtotal	0.93%	20.64%	73.76%	4.62%	0.06%
TOTAL IN-RIVER HARVEST	**5.23%**	**27.76%**	**63.35%**	**3.62%**	**0.04%**
TOTALS					
In-River Harvest and Escapement	5.83%	31.33%	59.82%	2.93%	0.10%
Angling Mortality (2% of Harvest)	17.63%	48.30%	33.34%	0.73%	0.00%
Net Mortality (8% of harvest)	0.93%	20.64%	73.76%	4.62%	0.06%
TOTAL IN-RIVER RUN	**5.73%**	**31.10%**	**60.10%**	**2.96%**	**0.10%**

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Table 5. Age composition of 1991 Klamath River fall chinook run based on scale analysis and coded wire tag data.

		Age Class			
		2	3	4	5 & 6
Scale	#	1,894	10,278	19,864	1,013
	%	5.73%	31.10%	60.10%	3.07%
Coded Wire Tag	#	1,307	11,366	20,304	71
	%	3.95%	34.39%	61.44%	0.21%

Table 6. Age composition of 1991 Klamath River fall chinook run.
(Using jack estimates from the Megatable and adult age composition data from scale analysis).

	Age					
	2	3	4	5	6	Total
Hatchery Spawners						
Iron Gate Hatchery	65	1,147	2,659	197	0	4,067
Trinity River Hatchery	179	1,967	542	10	0	2,698
Subtotal	244	3,114	3,200	207	0	6,765
Natural Spawners						
Trinity River (above Willow Ck)	52	2,548	2,329	69	0	4,998
Salmon River	211	231	1,242	30	26	1,740
Scott River	111	409	1,077	47	0	1,645
Shasta River	20	78	618	10	0	726
Bogus Creek	23	364	857	37	0	1,281
Main Stem Klamath River	27	70	318	9	2	426
Misc Klamath Tributaries	18	102	460	12	3	596
Reservation Tributaries	0	76	83	0	0	160
Subtotal	462	3,879	6,984	215	32	11,572
TOTAL SPAWNER ESCAPEMENT	706	6,993	10,184	422	32	18,337
Angler Harvest						
Klamath River (below US 101 br)	14	195	112	2	0	323
Trinity River (above Willow Ck)	36	595	544	16	0	1,191
Balance of Klamath System	474	992	570	9	0	2,045
Subtotal	524	1,783	1,225	27	0	3,559
Indian Net Harvest						
Klamath River (below US 101 BR)	7	554	3,109	237	2	3,909
Klamath River (US 101 to Trin.R.)	25	1,197	3,614	203	4	5,041
Trinity River	30	373	871	36	0	1,310
Subtotal	62	2,124	7,594	476	6	10,260
TOTAL IN-RIVER HARVEST	586	3,907	8,819	503	6	13,819
TOTALS						
In-River Harvest and Escapement	1,292	10,900	19,003	925	38	32,156
Angling Mortality (2% of Harvest)	10	36	25	1	0	71
Net Mortality (8% of harvest)	5	170	607	38	0	821
TOTAL IN-RIVER RUN	1,307	11,105	19,635	964	39	33,048

Table 7. Age composition (percentages) of 1991 Klamath River fall chinook run. (Using jack estimates from the Megatable and adult age composition data from scale analysis).

	Age				
	2	3	4	5	6
Hatchery Spawners					
Iron Gate Hatchery	1.60%	28.19%	65.37%	4.84%	0.00%
Trinity River Hatchery	6.63%	72.92%	20.08%	0.36%	0.00%
Subtotal	3.61%	46.03%	47.31%	3.06%	0.00%
Natural Spawners					
Trinity River (above Willow Ck)	1.04%	50.98%	46.59%	1.39%	0.00%
Salmon River	12.13%	13.27%	71.38%	1.70%	1.52%
Scott River	6.75%	24.89%	65.49%	2.87%	0.00%
Shasta River	2.75%	10.77%	85.06%	1.42%	0.00%
Bogus Creek	1.80%	28.42%	66.90%	2.89%	0.00%
Main Stem Klamath River	6.34%	16.50%	74.59%	2.02%	0.54%
Misc Klamath Tributaries	3.02%	17.09%	77.23%	2.09%	0.56%
Reservation Tributaries	0.00%	47.58%	52.12%	0.30%	0.00%
Subtotal	3.99%	33.52%	60.35%	1.86%	0.28%
TOTAL SPAWNER ESCAPEMENT	3.85%	38.14%	55.54%	2.30%	0.18%
Angler Harvest					
Klamath River (below US 101 br)	4.33%	60.43%	34.69%	0.55%	0.00%
Trinity River (above Willow Ck)	3.02%	49.96%	45.66%	1.36%	0.00%
Balance of Klamath System	23.18%	48.53%	27.86%	0.44%	0.00%
Subtotal	14.72%	50.09%	34.43%	0.76%	0.00%
Indian Net Harvest					
Klamath River (below US 101 BR)	0.18%	14.17%	79.53%	6.06%	0.05%
Klamath River (US 101 to Trin.R.)	0.50%	23.75%	71.69%	4.03%	0.08%
Trinity River	2.29%	28.48%	66.45%	2.77%	0.00%
Subtotal	0.60%	20.70%	74.01%	4.64%	0.06%
TOTAL IN-RIVER HARVEST	4.24%	28.27%	63.82%	3.64%	0.04%
TOTALS					
In-River Harvest and Escapement	4.02%	33.90%	59.10%	2.88%	0.12%
Angling Mortality (2% of Harvest)	14.72%	50.09%	34.43%	0.76%	0.00%
Net Mortality (8% of harvest)	0.60%	20.70%	74.00%	4.64%	0.06%
TOTAL IN-RIVER RUN	3.96%	33.60%	59.41%	2.92%	0.12%

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Table 8. Age composition of 1991 Klamath River fall chinook run based on jack estimates from the Megatable with adult age composition from scale analysis and coded wire tag data.

		Age Class			
		2	3	4	5 & 6
Scale	#	1,307	11,105	19,635	1,002
	%	3.96%	33.60%	59.41%	3.03%
Coded Wire Tag	#	1,307	11,366	20,304	71
	%	3.95%	34.39%	61.44%	0.21%